

**REMARKS**

Claims 1-5, 8, 10-13, 15-16 and 19 are pending in this application. By this Amendment, claim 1 is amended to define the presently claimed subject matter. The amendments to claim 1 are supported at least by page 21, lines 1-8 and page 25, lines 25-29 of the present specification. No new matter is added by this Amendment.

**I. Rejection Under 35 U.S.C. §103(a)**

Claims 1-5, 8, 10-13, 15-16 and 19 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over EP 1 074 640 A1 ("EP 640") in combination with Matsuda (U.S. Patent No. 5,645,706). Applicants respectfully traverse the rejection.

Claim 1 requires, among other features, (a) that the phosphate chemical treatment bath has a pH of 2.5 or lower and is substantially free of metal ions that will form a sludge, (b) that an amount of Fe ions dissolved in the phosphate chemical treatment bath is controlled by changes in the amount of Fe ions dissolved into the phosphate chemical treatment bath from a Fe ion source, the Fe ion source being at least one of (1) an electrode when said electrode comprises Fe, (2) a replenishing liquid containing Fe ions and (3) the metal material article to be treated when the metal article to be treated comprises a steel material, so that the phosphate chemical treatment bath does not contain  $\text{Fe}^{3+}$  ions in an amount of more than the solubility limit, (c) that  $\text{NO}_2$  and/or  $\text{N}_2\text{O}_4$  gas (generated and dissolved in the phosphate chemical treatment bath during a reduction reaction of nitrate ions of the electrolytic treatment) be substantially separated from the treatment bath by way of exposing the treatment bath to the atmosphere to a reduced pressure and (d) that the oxidation-reduction potential (ORP) of the phosphate chemical treatment bath be maintained at 770 mV to 960 mV, with the ORP being used to monitor the phosphate chemical treatment bath. These features (a)-(d) are able to achieve a substantial elimination of sludge formation in the

electrolytic phosphate chemical treatment method, and are nowhere found, as combined, in EP 640 and Matsuda.

**A. Control Of Fe<sup>3+</sup> Ions**

In the Amendment filed November 30, 2009 ("Amendment"), Applicants argued that the phrase "Fe<sup>3+</sup> is stably present in the bath" in Matsuda means that Fe<sup>3+</sup> is continuously and stably supplied to the bath, and does not describe that an amount of Fe<sup>3+</sup> ions dissolved in the treatment bath is controlled so that the treatment bath does not contain Fe<sup>3+</sup> ions in an amount more than the solubility limit, as required by feature (b)(3) in claim 1.

However, the Patent Office disagreed and alleged:

"However, since Fe ions cannot exist in solution as ferrous ion (Fe<sup>2+</sup>) but only as ferric ion (Fe<sup>3+</sup>), and ferric ions have strong coagulating properties that result in the formation of sludge when added to the treatment bath, **they cannot be used in the replenishing liquid.**

See Final Rejection, page 5 (citing JP 640, paragraph [0203] (emphasis added)). The Patent Office further alleged that if the ferric ions cannot be used in the replenishing liquid, then the ferric ions allegedly would not have been continuously and stably supplied to the bath. See Final Rejection, page 6.

However, EP 640 or Matsuda do not describe that an amount of Fe<sup>3+</sup> ions dissolved in the treatment bath is controlled so that the treatment bath does not contain Fe<sup>3+</sup> ions in an amount of more than the solubility limit as required in claim 1.

In EP 640, the Fe is (1) used as an electrode and (2) is one of the metal components that become a phosphate and enter a compound film formed on a work, such as steel. See EP 640, Abstract and paragraphs [0067] and [0197]. Accordingly, Fe ions from the Fe electrode are present in a treatment bath of EP 640, and EP 640 does not describe controlling Fe<sup>3+</sup> ions in the treatment bath.

The phrase " $\text{Fe}^{3+}$  is stably present in the bath" in Matsuda thus does not describe that an amount of  $\text{Fe}^{3+}$  ions dissolved in the treatment bath is controlled so that the treatment bath does not contain  $\text{Fe}^{3+}$  ions in an amount of more than the solubility limit as required in claim 1, and Matsuda does not remedy the deficiencies of EP 640.

Furthermore, regarding Matsuda, the  $\text{Fe}^{3+}$  is continuously and stably supplied in the bath. See Matsuda, column 13, lines 19-55 and Table 4. As a result, in Matsuda, sludge is inevitably formed (and must be removed) because the solubility product of  $\text{Fe}(\text{OH})_3$  is smaller than that of  $\text{Fe}(\text{OH})_2$  and an amount of Fe ions dissolved in the bath is not controlled. Matsuda thus does not remedy this deficiency of EP 640.

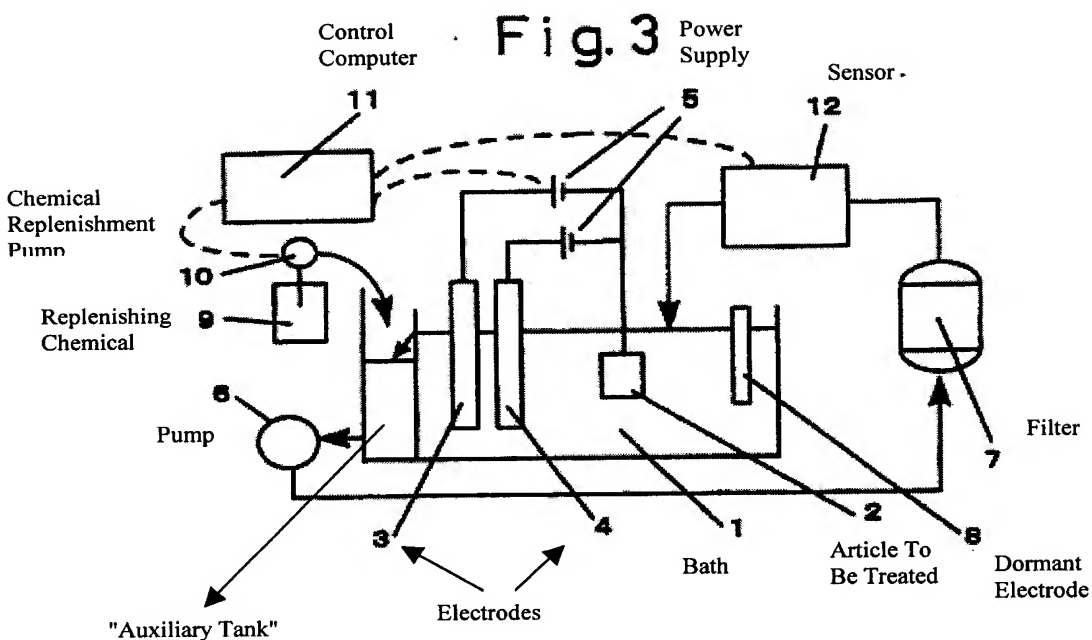
**B. Removal Of  $\text{NO}_2$  And/Or  $\text{N}_2\text{O}_4$**

In the Amendment, Applicants argued that EP 640 and Matsuda does not describe removing  $\text{NO}_2$  and/or  $\text{N}_2\text{O}_4$  generated and dissolved in the treatment bath during a reduction reaction of nitrate ions of the electrolytic treatment as required by feature (c) in claim 1, wherein removal is effected by separating a treatment tank into an electrolytic treatment tank where the electrolytic treatment is carried out and an auxiliary tank where no electrolytic treatment is carried out, circulating the treatment bath between the two tanks, and providing a mechanism that opens the treatment bath to the atmosphere at a reduced pressure either between the two tanks or within the two tanks.

However, the Patent Office disagreed and alleged that Figure 3 of EP 640 illustrates a divided tank that is "open" to the atmosphere (referred to on page 8 of the Final Rejection as an "auxilliary tank") and thus there is allegedly no reason why the openness of the divided tank would not function as a means to separate  $\text{NO}_2$  and/or  $\text{N}_2\text{O}_4$  from the treatment bath.

Applicants respectfully disagree and submit that the Patent Office's allegation that the "auxilliary tank" in Figure 3 of EP 640 is "open" to the atmosphere is incorrect and

unsupported by the disclosure of EP 640. For the convenience of the Patent Office, Figure 3 of EP 640 is illustrated below.



The details of Figure 3 are described at paragraphs [0175]-[0182] of EP 640. Nowhere does EP 640 indicate that the alleged "auxilliary tank" is open to the atmosphere. As shown above, Figure 3 of EP 640 merely indicates that (1) replenishing chemical 9 may be pumped using the chemical replacement pump 10 into the "auxilliary tank" or (2) that the liquid from bath 1 may be placed into the auxiliary tank.

In the present application, Figure 6 embodies an open system, wherein pressure reducing open line 13 is provided in addition to the main circulating line 12. Any  $\text{NO}_2$  and/or  $\text{N}_2\text{O}_4$  generated and dissolved in the phosphate chemical treatment bath is discharged from pressure reducing line 13. In contrast, Figure 7 of the present application embodies a "closed system" that does not contain any pressure reducing line, similar to Figure 3 of EP 640. In other words, both Figure 3 of EP 640 and Figure 7 of the present application are closed systems that do not contain any mechanism that opens the treatment bath to the atmosphere at

a reduced pressure either between the two tanks or within the two tanks, as required by claim 1.

Matsuda does not remedy this deficiency of EP 640. Thus, EP 640 and Matsuda also fail to describe this required feature of claim 1.

**C. Conclusion**

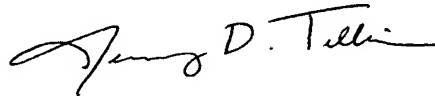
For at least the foregoing reasons, claim 1 would not have been rendered obvious over the combination of EP 640 and Matsuda. Moreover, there would not have been a reason to have combined EP 640 and Matsuda, because doing so would not have obtained the features of at least claim 1. Accordingly, reconsideration and withdrawal of the rejection are earnestly solicited.

**II. Conclusion**

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-5, 8, 10-13, 15-16 and 19 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



James A. Oliff  
Registration No. 27,075

Jeremy D. Tillman  
Registration No. 62,639

JAO:JDT/hs

Date: June 30, 2010

**OLIFF & BERRIDGE, PLC**  
**P.O. Box 320850**  
**Alexandria, Virginia 22320-4850**  
**Telephone: (703) 836-6400**

**DEPOSIT ACCOUNT USE  
AUTHORIZATION**

Please grant any extension  
necessary for entry of this filing;  
Charge any fee due to our  
Deposit Account No. 15-0461